DOCUMENT RESUME

ED 357 846 PS 021 317

AUTHOR Eimas, Peter D.; And Others
TITLE Development of Categorical Exclusivity in Young Infants.
PUB DATE Mar 93
NOTE 7p.; Paper presented at the Biennial Meeting of the Society for Research in Child Development (60th, New Orleans, LA, March 25-28, 1993).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Age Differences; *Classification; *Concept Formation; *Infants; *Learning Processes; *Perceptual Development

ABSTRACT

Previous research has shown that 3- to 4-month-old infants form a global categorical representation for cats that includes female lions, whereas 6- to 7-month-old infants differentiate between cats and lions. Three experiments using familiarization-novelty preference procedures attempted to determine whether the differentiation of a global categorical representation (in this case, the differentiation of lions and cats) is governed by maturational or experiential constraints. Experiment 1 replicated the basic finding that 3- to 4-month-old infants form a categorical representation for cats that excludes dogs, but includes female lions. Experiment 2 examined whether experience with cats and lions during familiarization would allow for categorical differentiation. Experiments 1 and 2 both began with an initial familiarization of 12 colored photographs of cats presented during six 15-second trials. Experiment 2 also provided a second familiarization experience that paired a familiar cat with a novel lion. The subsequent preference tests showed no reliable preference to observe novel lions over familiar cats. Dogs were preferred to cats and lions, but lions were not preferred to cats. In experiment 3, two cat-cat pairings were interspersed among the cat-lion pairings during the second familiarization period. Under these conditions, the infants exhibited preferences suggesting that the categorical representation for cats excluded both dogs and lions. (AC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

X Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED357846

DEVELOPMENT OF CATEGORICAL EXCLUSIVITY IN YOUNG INFANTS

Peter D. Eimas

Pamela Cowan

Paul C. Quinn

Cognitive & Linguistic Sciences
Brown University
Providence, RI 02912

"PERMISSION TO REPRODUCE THIS MATERIAL IN **OTHER THAN PAPER COPY** HAS BEEN GRANTED BY

Peter D. Eimas

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

PS 021317

Development of Categorical Exclusivity in Young Infants

An emerging perspective on conceptual development holds that the initial categorical representations for natural categories are global (Mandler, Bauer, & McDonough, 1991) or child basic (Mervis, 1987). Studies using the familiarization-novelty preference procedure have, for example, revealed that 3 and 4 month olds form a global representation for cats that excludes birds, horses, tigers and dogs, but includes female lions. At 6 and 7 months the representation also excludes female lions thereby approaching an adult basic-level of perceptual exclusivity (Quinn & Eimas, 1992; Quinn, Eimas & Rosenkrantz, in press).

Three experiments attempted to determine whether the differentiation of a global categorical representation, in this case, the differentiation of lions and cats, is governed by maturational or experiential constraints. In Experiment 1 we replicated the basic finding that 3 to 4 month olds form a categorical representation for cats that excludes dogs, but includes female lions. Infants were familiarized with 12 colored photographs of cats during 6 15-s familiarization trials (two animals per trial) and then given two novel category preference tests, each consisting of two 10-s trials: novel cat vs. novel dog, novel cat vs. novel lion. Infants reliably preferred the dogs, but not the lions.

Experiment 2 examined whether experience with cats and lions during familiarization would allow for categorical differentiation. Previous studies of form categorization conducted with adults and infants suggest that perceptual experience with contrasting categories aids in their differentiation (Homa & Chambliss, 1975; Quinn, 1987). Experiment 2 began as did Experiment 1 with an initial familiarization of 12 cats presented during 6 15-s trials, but then provided a second familiarization experience consisting of 6 15-s trials, each of which paired a familiar cat with a novel lion. The cat-lion pairs were randomly selected and

different for each trial. Infants then participated in the following preference tests: novel cat vs. novel dog, novel lion vs. novel dog, and novel lion vs. novel cat. Analysis of looking times during the second familiarization period revealed no reliable preference to observe novel lions over familiar cats, Mean Novelty Preference = 52.84%, SD = 11.62, $t(31) = 1.38$, $p > .10$, two-tailed. Test trial data in Table 1 reveal that dogs were preferred to cats and lions, but that lions were not preferred to cats. These results indicate that lions were not distinguished from cats, but rather had again become part of a global representation that excluded dogs.

In Experiment 3, our attempt at differentiation was predicated on the possibility that the categorical representation for cats presumably established during the first familiarization of Experiment 2 had not narrowed sufficiently so as to exclude lions during the second familiarization. The procedural details of Experiment 2 were repeated with one exception: Two cat-cat trials were added and interspersed among the cat-lion trials during the second familiarization period. These were intended to remind infants of the similarity among different cats and thereby to illustrate further the difference between cats and lions (cf. Rovee-Collier & Hayne, 1987). Under these conditions, infants now exhibited preferences suggesting that the categorical representation for cats excluded dogs and lions. Lions were preferred over cats during the second familiarization, $x = 55.02$, SD = 14.17, $t(31) = 2.08 < .05$, two-tailed. In addition, test trial data (Table 2) show reliable preferences for dogs and lions over cats, but not for dogs over lions. That novel dogs and novel lions were not distinguished suggests that lions were represented separately from cats as individual instances and not as a separate category.

We conclude that young infants can form highly exclusive perceptual categories provided that numerous exemplars from perceptually similar

categories are presented in a properly contrastive manner during early experience.

References

Homa, D. & Chambliss, D. (1975). The relative contributions of common and distinctive information on the abstraction from ill-defined categories. Journal of Experimental Psychology: Human Learning and Memory, 1, 351-359.

Mandler, J.M., Bauer, P.J., & McDonough, . (1991). Separating the sheep from the goats: Differentiating global categories. Cognitive Psychology, 23, 263-298.

Mervis, C.B. (1987). Child-basic object categories and early development. In U. Neisser (Ed.), Concepts and conceptual development. Cambridge: Cambridge University Press.

Quinn, P.C. (1987). The categorical representation for visual pattern information by young infants. Cognition, 27, 147-179.

Quinn, P.C. & Eimas, P.D. (1992, May). Basic-level category development during the first half year of life. Paper presented at the 8th International Conference on Infant Studies, Miami, FL.

Quinn, P.C., Eimas, P.D., & Rosenkrantz, S.L. (in press). Evidence for representations of perceptually similar natural categories by 3- and 4-month-old infants. Perception.

Rovee-Collier, C., & Hayne, H. (1987). Reactivation of infant memory: Implications for cognitive development. In H.W. Reese (Ed.), Advances in child development and behavior (Vol. 20). San Diego, CA: Academic Press.

Table 1

Mean Novel Category Preference Scores (percent) for Experiment 2

	Preference Pair		
	Cat/Dog	Lion/Dog	Cat/Lion
Preference	64.34[A]	60.16[A]	55.08[B]
SD	22.03	21.03	21.08
N	16	16	32
t (vs. chance)	2.60**	1.86*	1.36

[A] Preference for Dog
[B] Preference for Lion

*p< .05, one-tailed
**p< .05, two-tailed

Table 2

Mean Novel Category Preference Scores (percent) for Experiment 3

	Preference Pair		
	Cat/Dog	Lion/Dog	Cat/Lion
Preference	61.93[A]	54.21[A]	62.73[B]
SD	18.51	19.25	17.49
N	16	16	32
t (vs. chance)	2.56*	0.86	4.12**

[A] Preference for Dog
[B] Preference for Lion

*p< .05, two-tailed
**p< .001, two-tailed